

Infant mortality surveillance in Recife, Pernambuco, Brazil: operationalization, strengths and limitations

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Abstract

Objective: to report the experience on infant mortality surveillance (IMS) in the municipality of Recife-PE, Brazil. **Methods:** a documentary research and a query with key-informants who participated in the implementation and consolidation of the IMS were conducted; data of the Mortality Information System (SIM) and of the surveillance worksheets were used to measure the coverage of the investigated deaths. **Results:** the implementation of the IMS has occurred gradually since 2003; the strategy is composed by (i) identification of deaths, (ii) investigation, (iii) discussion, (iv) recommendations and correction of vital statistics; upon completion of implementation (2006), 98.5% (256) of the deaths had been investigated and discussed, with the participation of those involved in the cases; in 2015, this coverage corresponded to 97.7%. **Conclusion:** the main recommendations consisted of expanding the access, coverage and improvement of primary, secondary and tertiary care quality; IMS is able to support changes in health care practices, as well as planning and organization of maternal and child care.

Keywords: Infant Mortality; Epidemiological Surveillance; Information Systems.

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Introduction

Infant mortality surveillance (IMS) is recognized as an important strategy for raising awareness on the situation of health and assistance given by the maternal-infant care network. Therefore, it is an important tool to assess the Health System effectiveness.¹⁻⁴ From 2010 onward, the Brazilian Ministry of Health established infant and fetal mortality surveillance as mandatory in the whole country.⁵ Under this legal support, death investigation began to be recognized institutionally as a tool to understand the chain of death determinants, especially the preventable ones.^{5,6} However, the number of infant deaths investigated in the country still needs to be expanded.⁷⁻¹²

In the municipality of Recife, capital of Pernambuco State, the IMS was implemented as a critical-reflective tool for organizing health network, different from other Brazilian regions/ federative units where these activities were linked to the Municipal, Regional and States Committees for Mortality Prevention.^{2,13} The knowledge on the development process of IMS can contribute to the effectiveness of the strategy, besides providing relevant information on the challenges of operation and benefiting institutions that have not yet implemented or need to strengthen their IMS, by anticipating difficulties related to the rules established in the country and the socio-economic and organizational local context.

From 2010 onward, the Brazilian Ministry of Health established infant and fetal mortality surveillance as mandatory in the whole country.

This study aimed to report the experience of infant mortality surveillance in Recife, where the activity used to be performed before the establishment of this surveillance by the Ministry of Health. We addressed the utility of this strategy for managing maternal and infant health policy, producing relevant information and raising Health professionals' critical thinking.

Methods

A documentary research was carried out to rebuild the history of that intervention. Key-informants and files – printed and digital – of Recife's Health Department were consulted.

Recife, capital Pernambuco State, is located in the Brazilian Northeast region. According to 2010 Demographic Census, it comprised the fourth biggest urban population in Brazil: 1,537,704 inhabitants, of which 19,142 (1.24%) were children under one year old.¹⁴

The following documents were revised: implementation of IMS project,¹⁵ reports, presentations given to professionals of sanitary districts, congress presentations,¹⁶⁻¹⁹ official letters, internal communications and summary-files from infant deaths which had been investigated and discussed. The research and analysis of these documents were based on the identification and comprehension of core elements of the process of implementation, components, operation and recommendations from IMS, revealing its visible and latent content. Documents from 2002 (when the proposal for implementing the strategy was filed) to 2015 were selected.

After that, queries to key-informants and participants of the implementation and setting of this surveillance were conducted. The process of implementation, components, operation and recommendations of the IMS were described. To measure the strategy range, were used the Mortality Information System (SIM) and the worksheets built by the Municipal Health Department as a source of data to monitor the practice of IMS, related to the 2003-2015 period. The databases were provided by the aforementioned Department, in which we could access the absolute and relative frequencies of the investigated deaths. In Recife, SIM information is considered stable: historically, Recife has presented improvements in the coverage and quality of this system's data, which is used as a source of information on deaths and to the direct calculation of infant mortality.²⁰

This study was authorized by Recife's Health Department and was approved by the Research Ethics Committee from Aggeu Magalhães Research Center/ Oswaldo Cruz Foundation: Protocol No. 07336313.6.0000.5190, dated April 3rd, 2013.

Results

Implementation process of infant mortality surveillance – IMS

In 2002, after analyzing infant mortality situation in Recife, a proposal for IMS was presented; it was built collectively, with the participation of managers and workers from the health care and surveillance. The strategy had the following objectives: (i) to identify flaws

in maternal and infant health care which contributed to deaths, defining their preventability, (ii) to improve the quality of information systems and (iii) to use them for pondering, planning and adopting measures designed to reduce infant mortality.¹⁵

IMS operation occurred gradually in the six sanitary districts (SD) of Recife, which were conditioned by the availability of human resources and by the magnitude of the problem, being concluded in 2006. This strategy had been implemented in Recife before the Ministry of Health made it mandatory,⁵ as other experiences in other municipalities^{2,8,10,11} and states of the country.^{9,13}

In each SD, as well as at the central-municipal level, at least one technician with higher education degree was responsible for IMS and was trained to develop the expected activities. Among the desired requirements, this professional should have a global view of the Brazilian National Health System (SUS), especially its health care model, be a good listener and stimulate reflection, organize the investigation and lead discussions about the deaths, show abilities to assemble the group and to mediate conflicts. Their attributions were related to the execution and organization of investigation actions, promotion of inter-institutional contacts, management of discussions and reports elaboration.

Components, objectives and operationalization

The IMS is consisted of four components:

- a) Identification of infant deaths
- b) Epidemiological investigation
- c) Discussion about the deaths
- d) Issuing proposals for promotion, health care and correction of vital statistics;

Figure 1 represents a summary of the work process developed at IMS, highlighting the different roles of the central-municipal and SD levels.

The first component (identification of infant deaths) aims to capture – via the responsible area at the Municipal Health Department – all deaths registered through Death Certificates (DC), at health facilities, at the Services of Death Investigation (SDI), at the Forensic Medicine Institute (FMI) and in registry offices. After that, the eligible deaths that occurred in Recife are selected (excluding congenital malformations). Each of these deaths is directed to the IMS team, who is responsible for locating the respective Certificate of Live Birth (CLB) in the database of the Information System on Live Births (Sinasc). Considering the mother's residence address,

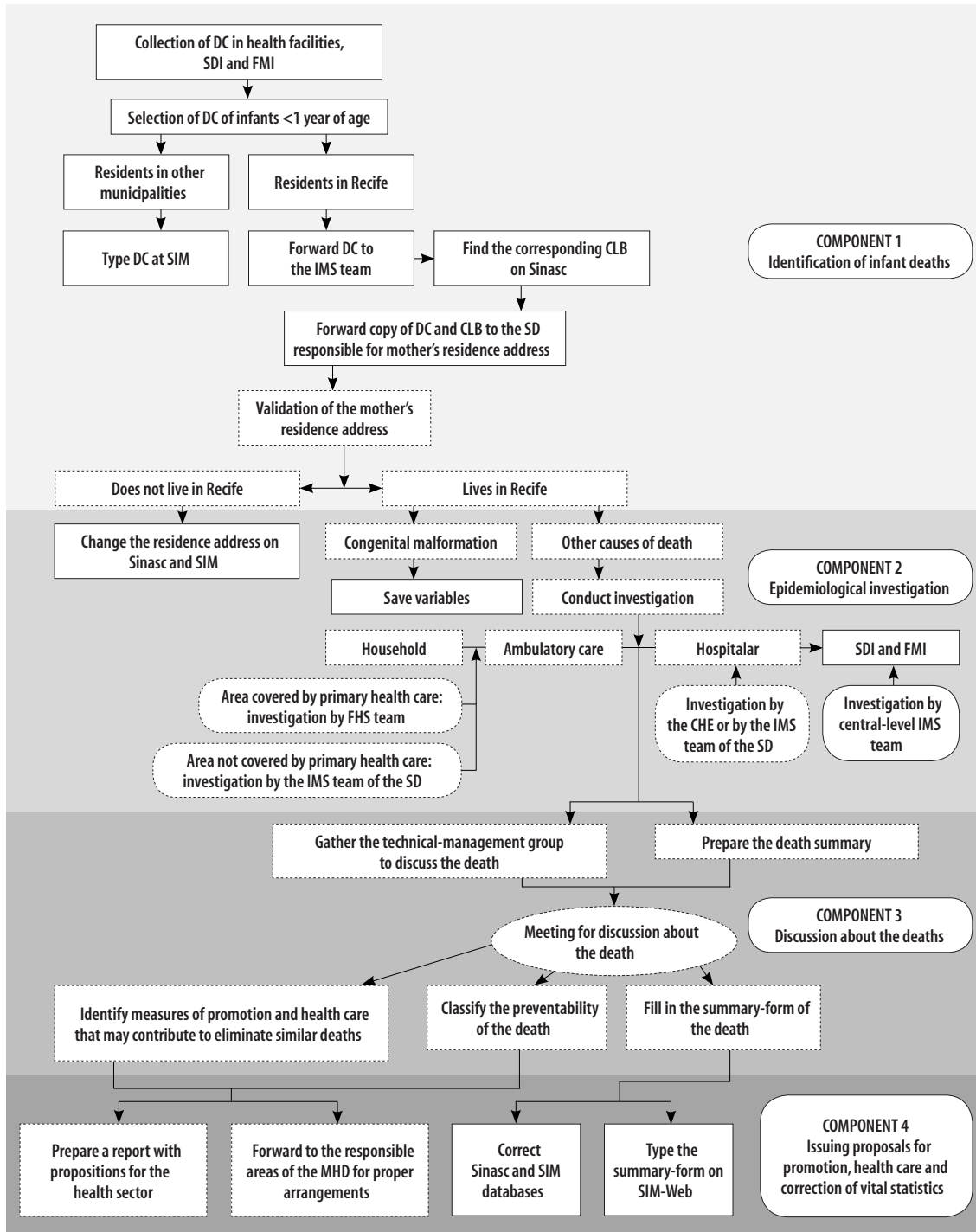
the copies of the DC and the CLB are forwarded weekly to the sanitary districts, responsible for the investigation process in their territories.

The mother's address validation is done through a household visit, using a specific form, under responsibility of the Family Health Strategy (FHS) and Community Health Agents Program (CHAP) teams, in the areas covered by the FHS and CHAP. In areas where there is no coverage, this activity is performed by the IMS team of the district. As a result of this procedure, about 10% of the records of mothers' household addresses related to infant deaths need to be rectified to another municipality.¹⁷

The second component (epidemiological investigation) aims to identify the events that led to death, and its activity consists of investigation at households, at maternal and infant healthcare facilities (since their pregnancy) and at necropsy services, depending on the case. For this step, a confidential form is used, which is composed of variables related to (i) the identification of the child and their mother, (ii) family characteristics, data of (iii) pregnancy, (iv) prenatal care, (v) childbirth, (vi) childcare, (vii) ambulatory and hospital care to the pregnant woman and the child, and (viii) the occurrence of death. The form used in Recife encompasses all variables recommended by the Brazilian Ministry of Health.⁶

The professionals of primary health care and/or the IMS of the SD carry out researches on outpatient medical records and interviews at households. Hospital investigations are conducted by the IMS team of the sanitary district and of the Centers of Hospital Epidemiology; and at the necropsy services, by the IMS team of central-municipal level.

The discussion about the deaths, the third component, aims to evaluate the Health sector's role in the occurrence of deaths. For that purpose, a summary of the information gathered by the investigation is prepared, destined to the discussion of the deaths by the Technical-Management Group of IMS. This group is formed by the coordinator of mortality surveillance in the sanitary district, the FHS and CHAP teams, professionals from hospitals involved with pregnant women and child care, DS managers/technicians and from the central level of surveillance and health care (specific policies for children and women, and primary health care). The discussion about the deaths with the individuals involved in health care is a strong characteristic of Recife's IMS, making it different from other initiatives in which this discussion happens



Note:
 Key: DC = Death Certificate; SDI = Service of Death Investigation; FMI = Forensic Medicine Institute; IMS = Infant Mortality Surveillance; CLB = Certificate of Live Birth; Sinasc = Information System on Live Births; SD = sanitary district; FHS = Family Health Strategy; CHE = Centers of Hospital Epidemiology; and MHD = Municipal Health Department.
 Actions of competence of the central-municipal level (————) and sanitary districts (SD) (-----).

Figure 1 – Components and activities of infant mortality surveillance in Recife, Pernambuco, 2015

only at committees of infant mortality investigation, of municipal, regional or state levels.^{2,13}

The discussions are conducted at the SD or in hospitals where the deaths occurred, with educative, contemplative and propositional purposes, other than coercive or punitive, and with a focus on the search for determinants and preventability factors, to evaluate health care and propose intervention measures.²¹ A recent recommendation of the Ministry of Health⁵ establishes that, after this discussion, the summary-form of the infant death must be filled in; this document aims to register the analysis or closure of the case investigated and discussed by the Technical-Management Group.

The fourth and last component of IMS refers to issuing proposals for promotion, health care and correction of vital statistics of infant mortality. Activities in this component are related to preparing and sending reports with propositions destined to the Health sector and its responsible areas, for their proper arrangements. The required corrections are made at SIM and Sinasc.²¹ From 2010 onward, the state started typing the data of the summary-form in the module 'Investigation of infant and fetal mortality' at SIM-Web, as recommended by the Ministry of Health.⁵

Situation and contributions

In 2003, the first year of implementation of the infant mortality surveillance, 27.5% of deaths with

no congenital malformation were investigated and discussed. This proportion reached 98.5% in 2006, with the conclusion of the implementation process in all SD, maintaining the same level until 2015 – the last year of the analyzed time series (Table 1).

After more than ten years of IMS implementation, among other several recommendations of the Technical-Management Group to avoid new deaths, the expansion of access and coverage, and improvement in the quality of primary, secondary and tertiary care were addressed with higher emphasis. All these actions are related to reproductive life planning, prenatal care, delivery and childbirth care, and child care during their first year of life.

Discussion

All components of IMS in Recife, in the search for comprehensive care and involvement of health professionals responsible for maternal and infant care (on the several assistance levels in the health care network, specified in each evaluated event), promote the reflection about assistance networks of inter-federative management, articulating clinical and organizational dimensions in its operationalization. This procedure has been helping on the acknowledgement that no organization or professional, isolated, gathers enough competence to solve health issues of complex determination.²²

Table 1 – Situation of infant mortality surveillance in Recife, Pernambuco, 2003-2015

Year of Death	Number of Infant Deaths			Deaths eligible for investigation ^a		Deaths investigated and discussed	
	Neonatal	Post-neonatal	Total	N	%	N	%
2003	262	117	379	298	78.6	82	27.5
2004	251	118	369	287	77.8	64	22.3
2005	268	113	381	300	78.7	75	25.0
2006	232	94	326	260	79.8	256	98.5
2007	191	89	280	214	76.4	214	100.0
2008	193	81	274	214	78.1	203	94.9
2009	217	95	312	231	74.0	229	99.1
2010	197	84	281	211	75.1	211	100.0
2011	197	83	280	206	73.6	206	100.0
2012	198	77	275	212	77.1	208	98.1
2013	210	78	288	209	72.6	209	100.0
2014	198	82	280	204	72.9	193	94.6
2015	179	73	252	176	69.8	172	97.7
Total	2,793	1,184	3,977	3,022	76.0	2,324	76.9

a) All infant deaths, except those with congenital malformation with underlying cause.

According to results of studies performed in Paraná (2000-2001 and 2007-2008, 2005 and 2005-2008),^{2,8,10} Rio Grande do Sul (2005-2008),¹¹ São Paulo (2006),¹³ Minas Gerais (2014),¹² Alagoas (October, 2009 to December, 2010)⁷ and Bahia (2008),⁹ the number of infant deaths investigated in the country was small. In Recife, since 2006, almost all infant deaths – except those due to congenital malformation – have been investigated and discussed.

Infant mortality surveillance, when trying to eliminate barriers of dialogue between professionals with different knowledge and competence, inserted in different health services, promotes the social and technical-care knowledge of the situation in their territories and the cohesion in the search for better ways to tackle complex situations, experienced daily by the health services.^{3,4,10,11,22,23}

The infant mortality surveillance in Recife, when gathering – in the discussion – the individuals involved

in the assistance of the case, brings an innovative experience, capable of supporting changes in health care practices, in the qualification of Health workers and managers, in planning and organizing maternal and infant care network.

Authors' Contributions

Oliveira CM, Bonfim CV and Guimarães MJB contributed to the conception and design of the study, analysis and interpretation of data, writing and relevant critical review of the manuscript's intellectual content. Frias PG, Antonino VCS and Medeiros ZM contributed to the analysis and interpretation of data and relevant critical review of the manuscript. All authors approved the manuscript's final version and declared to be responsible for all aspects of the study, ensuring its accuracy and integrity.

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